Electrical Vehicle Battery Change System (EVBCS)

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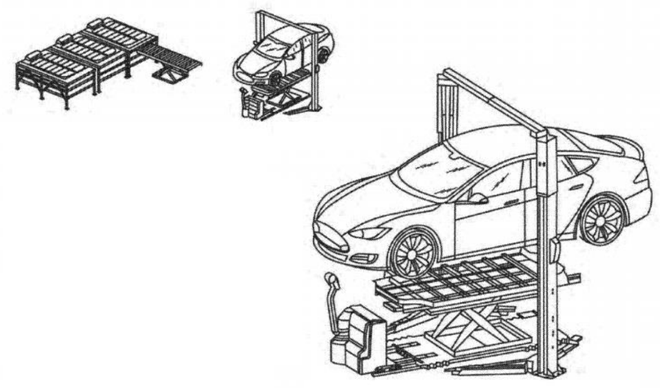
Abstract

Although electric vehicles have many advantages, recharging the battery in these vehicles is time consuming. It takes a long time to fully charge the battery and often uses a special charging station. Battery swap systems have been attempted, but these systems typically have severe drawbacks This research is based on designing a self-service removable battery. This battery design is a unique one. It is easy and comfortable to remove and insert the battery from both slots in the Electrical Vehicle and the charging station. The station is a special design trailer.

Other attempts drawbacks

Need to build special expensive facilities that require a large area. For example a single swapping station of Better Place costs $500,000 to build [1].

Need trained workers to operate the swapping station.



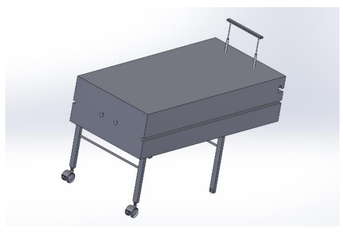
TESLA swapping system [2]

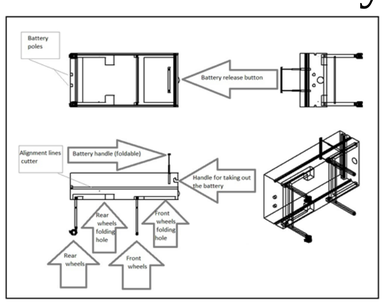
High consumer cost, the consumer cost for swamping a single battery ranges from $80 to $100 (for example: Better Place, a battery swapping company).

Proposed Method

Part 1 [3]

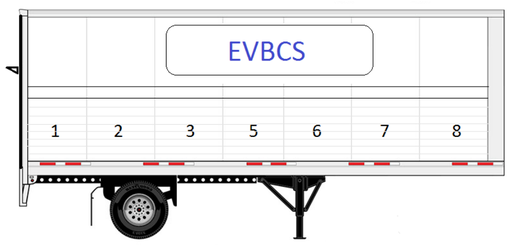
Is based on designing a self-service removable battery, this battery design is a unique one. It is easy and comfortable to remove and insert the battery from both slots in the EV and the charging station by special mechanism and the battery has easily foldable wheels, this wheels will fold automatically by a special design.

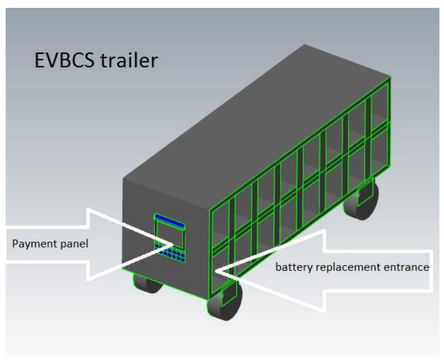




Part 2 [3]

The charging station is a special design trailer. It consists of a number of the charging cells, the number of the cells will vary according to the station model.





HOW IT WORKS

The system trailer arrives to any parking lot or rest area → The user locates the nearest station using mobile App → The user arrives at the station → The user removes the battery from his car then moves to the EVBCS station → The user making payment using the payment panel → The user inserts his discharged battery in the selected swapping slot → A charged battery is released from a selected swapping slots → User goes back to the car and inserts the charged battery → The car is ready to move → A discharged battery is automatically and mechanically moved to a suitable cell in the charging station to be charged

Conclusion

The advantages of EVBCS system includes; no need to build any special facility, easy to move to any place, low initial cost, self-service, and low consumer cost.

References

[1] Chuck Squatriglia, “Better Place Unveils an Electric Car Battery Swap Station”, www.wired.com. May 13, 2009.
[2] Fred Lambert,” Tesla is working on a new mobile battery swap-technology to deploy out of trailer”, electrek.co. September15, 2017.
[3] Elleithy and Mohamed. A System for Electrical Vehicle Battery Swapping. Pending Patent.